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SAN FRANCISCO INTERNATIONAL AIRPORT

ENTRANCE/EXIT EQUIPMENT REVIEW

September 1, 1978

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ENTRANCE/EXIT EQUIPMENT REVIEW

Discussion Topics

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POTENTIAL LOSS EXPOSURE

EQUIPMENT CONTROL FEATURES

INDIVIDUAL EQUIPMENT CHARACTERISTICS AND COSTS

BENEFIT/COST ANALYSIS OF ALTERNATIVE SYSTEMS

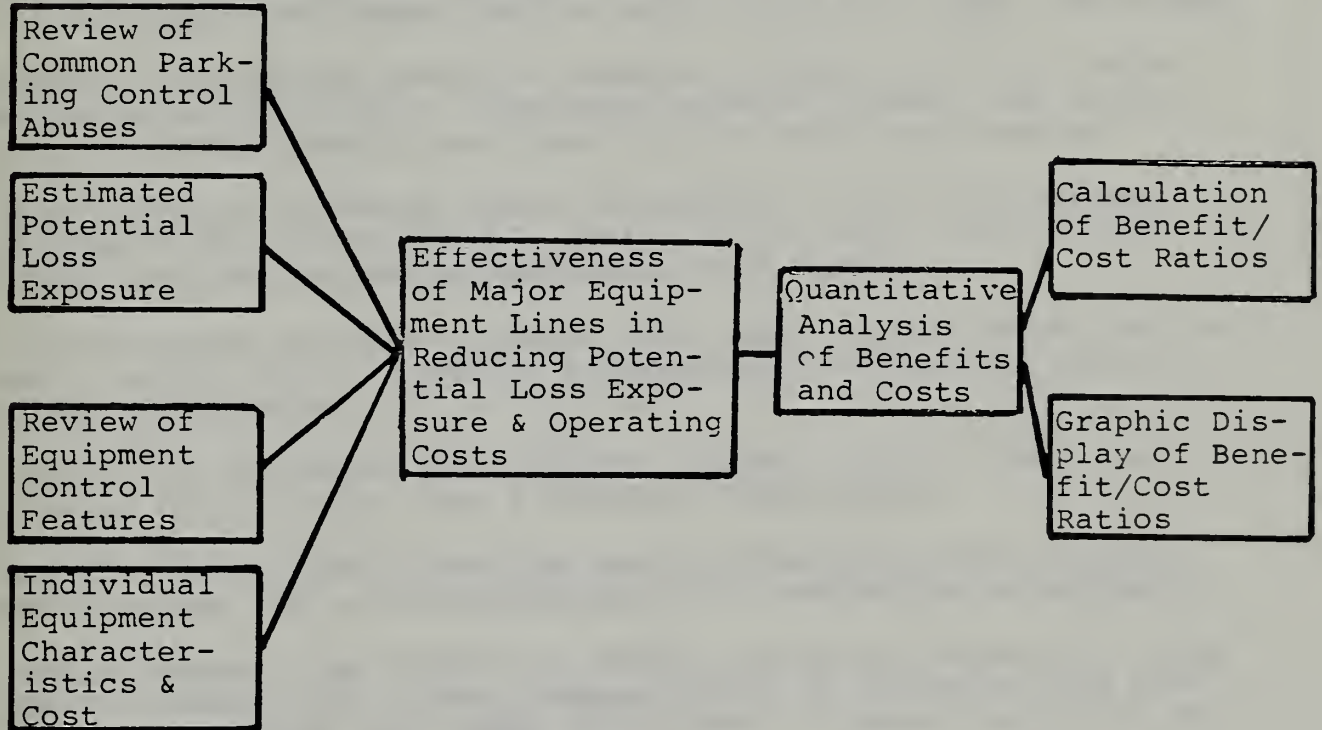
CONCLUSIONS AND RECOMMENDED ACTIONS

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## INTRODUCTION

- Entrance and exit equipment being installed at airports today varies widely in price and capabilities. A key aspect in determining what equipment to acquire is an evaluation of the benefits of additional capabilities relative to their cost.
- The chart below depicts the major activities in a benefit/cost analysis of entrance and exit equipment:



- The benefit/cost analysis discussed in the following pages is based on preliminary and unsubstantiated data. The primary purpose of the analysis is to present an approach, not an answer, that can be followed as more accurate data becomes available.



### COMMON PARKING CONTROL SYSTEM ABUSES

A variety of defalcation schemes exist to defraud parking garage operators. Some of the more common schemes that are related to operations at the San Francisco Airport include:

- Cashier charges patron correct amount, discards patron's ticket and substitutes extra, lower charge ticket, and keeps the difference between the correct and lower charge amounts
- Third party obtains an extra ticket and sells it to a patron holding a higher fee ticket; patron exits using the lower fee ticket
- Cashier under-rings amount of charge, informs patron of error, collects correct amount, discards patron's ticket, and substitutes a forged lost ticket form for the under-ring amount
- Patron with a long-term ticket exchanges ticket with partner holding a short-term ticket; patron exits using a short-term ticket and partner exits claiming a lost ticket

Cashier rings up correct amount, but tells patron amount due is more; patron fails to notice discrepancy, and cashier keeps the amount overcharged

- Cashier, in collusion with patron, forges a lost ticket form for a lower fee in return for a kickback from patron
- Cashier, in collusion with patron, deliberately miscalculates parking time and undercharges patron in return for a kickback
- Cashier under-rings amount of charge, collects correct fee from patron, alters time clock, stamps ticket to coincide with the under-ring amount, and keeps difference in amount collected and amount rung-up on cash register
- Parking garage management and employees collude to circumvent internal controls and falsify records, thus defrauding parking garage owner

(See Appendix A for a detailed description of these defalcation schemes and the preventive measures used to control them.)

The extent to which these abuses exist in a parking operation creates a potential for loss of revenue.







## POTENTIAL LOSS EXPOSURE

Six categories of tickets are used in the SFIA parking operation. Three types of tickets generate revenue and the others do not.

### Revenue Tickets

- Regular - parking fee of less than:
  - . \$24 in the garage
  - . \$12 in the economy lot
- Layover - parking fee equal to or more than:
  - . \$24 in the garage
  - . \$12 in the economy lot
- Lost - patron claims parking ticket was lost and:
  - . Is required to fill out a lost ticket form (Exhibit I)
  - . Is charged for hours claimed to have been parked, unless a longer period can be supported by the layover report

### Non-Revenue Tickets

- Minus 7 minutes - patron was in parking facility for less than 7 minutes
- Non-revenue - patron parking ticket signed by designated SFIA or APM personnel, thus granting free parking
- Valet - special ticket given to cashier by valet attendant when retrieving patron's car from parking garage

APM maintains two types of general count control over tickets used in daily operations. These controls highlight:

- Missing tickets - cashier's cash register transaction count total exceeds tickets collected during the shift
- Unaccounted tickets - APM report (Exhibit II) identifies tickets that cannot be accounted for during the month



No 73976

**SFIA PARKING LOST TICKET FORM**

ENTRANCE  
LOCATION ..... DATE & TIME .....

KEY IN DRIVERS POSSESSION .....

**VEHICLE REGISTRATION INSPECTION:**

CAR LIC. NO. ....

REGISTERED OWNER .....

ADDRESS .....

CITY ..... STATE .....

**DRIVER INFORMATION:**

DRIVER LIC. NO. & STATE .....

NAME .....

ADDRESS .....

CITY ..... STATE .....

I PAID \$..... IN FULL PAYMENT OF  
MY PARKING OBLIGATION.

SIGNATURE OF OPERATOR OF VEHICLE

.....

Signature of AIRPORT PARKING MANAGEMENT  
or AIRPORT POLICE employee authorizing release.

NAME .....

TITLE .....



## SAN FRANCISCO INTERNATIONAL AIRPORT GARAGE

## UNACCOUNTED PARKING TICKETS

MONTH OF JUNE 1978

GARAGE	LOT B	LOT D	VALET	TOTAL
Other Tickets Issued	-	26940	7362	338,628
Product: Defective Tickets	-	222	-	1448
Test Tickets	-	90	-	240
Adjustments	-	-	① AMV LATE (2) SEC PAID	
Actual Tickets Issued	-	26628	7342	336,940
Beginning Auto Inventory	-	1529	203	3,343
Total	-	28157	7565	340,283
Product Tickets Collected	-	25790	7393	336,052
Computed Ending Inventory	-	2367	172	4,231
Actual Ending Inventory	-	1946	172	3,236
Missing (excess) Tickets	-	421	-	995
Percentage Missing	-	1.6 %	-	.29 %
Actual Missing (excess) Tickets	68	622	-	1730
Actual Tickets Issued	14037	190578	54149	222,720
Average Percentage	.48 %	.33 %	-	.08 %





There are four areas of potential loss exposure that would not or may not be detected by the current system of cash controls:

- Lost tickets - patron claims less time parked than actual and layover report does not substantiate a longer period
- Non-revenue tickets - authorized signature is forged and patron receives unauthorized free parking
- Missing tickets - specific cash transaction rung up by cashier cannot be supported by a parking ticket
- Unaccounted ticket - several defalcation opportunities exist if cashier or patron can obtain an extra, lower fee ticket

In our review of the cash controls applied by APM and SFIA, we concluded that, with the exception of certain hiring practices, the controls are adequate to safeguard cash from the individual perpetrator. We also noted that while the controls could be circumvented by a number of people acting together, we found no indication of either current or prior collusive fraud. In light of these findings, any estimate of potential loss exposure is highly subjective. The sole purpose of developing loss exposure projections is to provide a range of exposure levels for the benefit/cost analysis.

A range of potential loss exposure for the parking operation was estimated for 1977 and the first half of 1978. To develop the projections, the following assumptions were made:

- The average potential loss for each exposure ticket ranged between one and five times the average revenue per car during the period. In dollar terms, this resulted in the following ranges:
  - . 1977 - \$2.56 to \$12.80 per ticket
  - . 1978 - \$2.89 to \$14.45 per ticket
- Only 10% of the non-revenue tickets were considered to be potential forgeries because:
  - . Most patrons probably do not know about non-revenue tickets nor who is authorized to sign them
  - . Each non-revenue ticket is examined by APM staff personnel to identify irregularities.

Potential loss exposure for the parking operation in 1977 and 1978 (6 months) is shown in Exhibit III. As indicated in the Exhibit, the potential loss exposure ranged from:

- \$50,000 to \$250,000 in 1977
- \$35,000 to \$165,000 in the first half of 1978





EXHIBIT III

POTENTIAL LOSS EXPOSURE

1977 & 1978 (6 months)

	1977			1978 (6 months)		
	Tickets	\$2.56* loss per ticket	5 x \$2.56 loss per ticket	Tickets	\$2.89* loss per ticket	5 x \$2.89 loss per ticket
Unaccounted	2,507	\$ 6,418	\$ 32,090	1,639	\$ 4,737	\$ 23,685
Lost	13,908	35,604	178,020	8,008	23,143	115,715
Missing	52	133	665	21	61	305
Non-Revenue	34,594	8,856**	44,280	17,140	4,953	24,765
Total	51,061	\$51,011	\$255,055	26,808	\$32,894	\$164,470

Potential Exposure Tickets

Total Tickets Issued	2,864,799
% Exposure Tickets to Total Tickets	1.8%
Total Revenue	\$8,288,723
% Exposure Dollars to Total Revenue	0.6%
	3.1%
	0.7%
	3.7%

\*Average revenue per car during period

\*\*Only 10% of non-revenue tickets used to estimate potential exposure since each non-revenue ticket is examined by APM staff



#### EQUIPMENT CONTROL FEATURES

Recent developments in entrance and exit equipment have resulted in a wide range of new control features that can be used to control many of the system abuses previously discussed:

Entrance spitters have been developed to:

- Impound unclaimed tickets
- Electronically relay specific ticket information to a central computer whenever a ticket is taken, but no automobile enters the garage

Exit equipment control features include:

- On-line computer systems with varying capabilities
  - . Immediate information on approximate length of vehicle stay (when accompanied by some type of vehicle inventory procedure)
  - . Automatic fee calculation
  - . Detailed audit trails
  - . Comprehensive performance reports
- Off-line computer systems which have the same features as an on-line system except for immediate information on length of vehicle stay
- Automatic fee calculating cash registers using machine-readable tickets
- Automatic fee calculating cash registers using manual entry of "time-in" at garage

As indicated in Exhibit IV, the on-line computer system controls the greatest number of defalcation schemes.



EQUIPMENT FEATURES TO CONTROL POTENTIAL DEFALCATIONS

Defalcation Schemes	Exit Equipment Features	On-line Computer System(1)	Off-line Computer System(1)	Automatic Fee Calculation		Manual Cash Register
				Machine Read- able Tickets	Manual Input	
Extra Ticket (2)						
Cashier		X				
Third Party and Patron		X				
Lost Ticket						
Cashier		X	X	X		X
Patron and Partner		X				
Overcharge Patron (3)						
Reduce Charge for Kickback and Use Lost Ticket Form		X				
Miscalculate Charge for Kickback		X	X	X		X
Manipulate "Time Out" Stamp		X	X	X		X
Systematic Fraud		X	X	X		X

(1) Includes automatic fee computation

(2) Can also be controlled using special ticket spitters, regardless of type of exit equipment

(3) Control primarily with a visual fee indicator





INDIVIDUAL EQUIPMENT CHARACTERISTICS AND COSTS

Equipment characteristics vary among computer-based systems, as well as between computer-based and non-computer-based systems. Key characteristics for six major manufacturers are summarized in Exhibit V.

Approximate system costs for the anticipated SFIA configuration are presented in Exhibit VI.



EXHIBIT V

EQUIPMENT CHARACTERISTICS  
FOR SIX MAJOR MANUFACTURERS

	NON-COMPUTER BASED			COMPUTER BASED		
	STANLEY	CINCINNATI	WILLIAM D. WHITE & CO.	PPI	ELECTRON	AUTOTOTF
<u>Ticket Characteristics:</u>						
Type Encoding						
Printed	x	x	x	x		x
Punched hole and printed					x	
Magnetic ink and printed						
Data Encoded						
Entry date and time	x	x	x	x	x	x
Exit date and time	x	x	x	x	x	
Fee		x		x	x	
Entry lane			x	x	x	
Rate code				x	x	
Cashier identifier			x	x	x	
Cashier transaction sequence #				x	x	
Exit lane	x			x	x	
<u>Spitter Characteristics</u>						
Loop sensor activated	x	x	x	x	x	x
Impounds unclaimed ticket					x	
Clock set by master clock		x		x	x	x
Clock runs independent of master	x	x	x	x	x	x
<u>Exit Cashier Characteristics</u>						
Fee Computation						
Fully automatic				x	x	x
Manually input each time		x	x			
Computes change					x	
Customer Receipt						
Entry date and time		x			x	x
Exit date and time		x			x	x
Fee		x		x	x	
Entry lane			x		x	
Rate code				x	x	
Cashier identifier	x		x	x	x	
Cashier transaction sequence #			x	x	x	
Exit lane				x	x	
<u>Automated Reports</u>						
		x	x	x	x	x



## APPROXIMATE SYSTEM COST

	STANLEY	CINCINNATI	WILLIAM D. WHITE & CO. (AUTOMATIC PARKING DEVICES)	PARKING PRODUCTS INC. (PPI)	ELECTRON, INC.	AUTOTOTE, INC.
TOTAL SYSTEM COST (11 ENTRANCES AND 15 EXITS)	\$171,500 - \$261,000	\$171,500 - \$261,000	\$171,500 - \$238,500	\$335,000 - \$402,000	\$401,000 - \$895,000	\$726,000 - \$895,000
ENTRANCE EQUIPMENT (per lane)	\$ 5,000	\$ 6,000	\$ 4,000	\$10,000-\$12,000	\$ 16,000	\$18,000-\$20,000
EXIT EQUIPMENT (per lane)	\$8,500-\$13,000	\$8,500-\$11,000	\$ 11,000	\$15,000-\$18,000	\$ 18,000	\$30,000-\$35,000
CENTRAL CONTROL EQUIPMENT	\$5,000-\$10,000	\$ 10,000	\$ 10,000	\$ 5,000-\$10,000	\$100,000-* \$150,000	\$100,000-\$150,000*

\* Cost of conduit and wiring to support on-line applications is not included in this estimate.

NOTE: ALL FIGURES ARE MANUFACTURER'S PRELIMINARY  
ESTIMATES AND INCLUDE INSTALLATION AND  
A 12 TO 18 MONTH MAINTENANCE AGREEMENT.



# BENEFIT/COST ANALYSIS OF ALTERNATIVE SYSTEMS

Control equipment can be evaluated by estimating the benefits and costs of alternative systems. The estimates used in this analysis are based on the following:

<u>Estimate</u>	<u>Source</u>
- Cost of alternative systems	Interviews with equipment company representatives
- Impact of each system on potential loss exposure	Interviews with airport officials and equipment company representatives
- Impact of each system on operating costs at SFIA	Interviews with SFIA and APM personnel

These estimates should be considered preliminary since it has not been possible to observe each system in operation or to obtain independent empirical data on system effectiveness. In addition, the cost estimates obtained from manufacturers are "ballpark" figures subject to modification when bids are actually submitted.

The estimated range of effectiveness of major equipment lines in reducing SFIA's potential loss exposure is presented in Exhibit VII.

The approximate costs of each of the basic system components and a quantification of the estimated benefits from reductions in loss exposure and operating costs are presented in Exhibit VIII.



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IMPACT ON LOSS EXPOSURE

Description of Area of Potential Loss Exposure	Key to Successful Defalcation Scheme	1977 Max. Potential Loss Exposure	Controls Available To Prevent Such Losses	Range of Effectiveness	Equipment Capability				Manual Systems or Other Equipment
					Auto Tot	Elec- tron	Cincin- nati	PPI Inc.	
Unaccounted tickets	Obtain extra ticket	\$32,090 (12.6%)	Spitters impound unclaimed tickets	Low-moderate		X			
			Relay ticket information when ticket is taken and no car enters garage	Very high		X		X	
			Place spikes behind spitter to prevent backing off	Moderate					X
			Cash register receipt shows entry/exit times, fee, cashier	Moderate		X	X	X	X
			Central computer inventory of all cars (online)	High	X	X		X	
			Central computer inventory of layover cars	Moderate-high	X	X		X	
			Manual inventory record (layover list) checked	Moderate					X
			Audit procedures for cashier control	Moderate-high					X
			Cash register automatically calculates parking fee	Moderate-high	X	X	Semi-auto.	X	Semi-auto.
			Central computer inventory of all cars (online)	High	X	X		X	
Loss tickets	Inadequate records of layover cars Substitution by cashier Reducing charge for kick-back	\$178,020 (69.8%)	Central computer inventory of layover cars	Moderate-high	X	X		X	X
			Annual inventory of layovers	Moderate					X
			Audit procedures (Tel # on ticket)	Low					X
			Automatic fee calculation	High	X	X	Semi-auto.	X	Semi-auto.
			Audit procedures to identify miscalculations	Moderate					X
			Visual fee indicator	Moderate	X	X	X	X	
			Automatic fee calculation	Moderate	X	X	S. A.*	X	S. A.*
			Receipt shows entry/exit times, fee, cashier	Moderate		X	X	X	X
			Audit procedures	Moderate					X
			Control of tickets and time stamp	Moderate-high	X	X	X	X	X
Other schemes	Manipulation of "time out" stamp Overcharging patron	Unknown	Visual fee indicator	Moderate	X	X	X	X	X
			Automatic fee calculation	Moderate	X	X	S. A.*	X	S. A.*
			Receipt shows entry/exit times, fee, cashier	Moderate		X	X	X	X
			Audit procedures	Moderate					X
			Control of tickets and time stamp	Moderate-high	X	X	X	X	X
			Visual fee indicator	Moderate	X	X	X	X	X
			Automatic fee calculation	Moderate	X	X	S. A.*	X	S. A.*
			Receipt shows entry/exit times, fee, cashier	Moderate		X		X	X
			Audit procedures	Moderate					X
			Audit procedures	Moderate					X

\*Semi-automatic



QUANTITATIVE ANALYSIS OF BENEFITS AND COSTS

	EQUIPMENT	MANUFACTURERS	COST (APPROX)	CAPABILITY AND SPECIAL FEATURES	MAXIMUM REDUCTION IN POTENTIAL LOSSES		REDUCTION IN OPERATING COSTS	
					(%)	(\$)	(Description)	(S. F. International Airport) (\$)
A (1)	ENTRANCE Minimum Capability	Stanley APD	\$4,000/lane - \$6,000/lane	Basic spitter, gate, intercom, detector and reset device	-0-	-0-	None	-0-
A (2)	Intermediate Capability	PPI	\$10,000/lane - \$12,000/lane	Punched code system used for ticket spitter plus conventional equipment	On-line= 90% Off-line= 30%	(1) \$28,881 \$9,627	Not material	-0-
A (3)	Maximum Capability	Electron Autotote	\$16,000/lane - \$20,000/lane	Unclaimed ticket impounded; information on each vehicle is relayed at entry (on-line)	On-line= 90% Off-line= 30%	(1) \$28,881 \$9,627	Not material	-0-
B (1)	EXIT Conventional Cash register + Exit equipment	Cincinnati APD	\$8,500/lane - \$13,000/lane	Manual calculation of fee; manual entry into cash register	-0-	-0-	None	-0-
B (2)	Manual entry Cash register + Exit equipment	William D. White & Co. Cincinnati	\$8,500/lane - \$11,500/lane	Manual input of entry timer; semi-automatic fee calculation	20%-40%	(2) \$35,600- \$71,200	(3) 4.5%-9% reduction in time required per exit	\$22,000 - \$44,000
B (3)	Automatic fee Calculation + Exit equipment (A)	Electron PPI	\$15,000/lane - \$18,000/lane	Machine reads ticket and calculates fee; Cashier makes change only	40%-60%	(2) \$71,200- \$106,800	(4) 9%-18% reduction in exit time Increased service costs	\$44,000 - \$88,000 (\$10,000- \$20,000)
B (4)	Automatic fee Calculating Cash register + Exit equipment	Autotote	\$30,000/lane - \$35,000/lane	Machine reads ticket and calculates fee; cashier makes change only	40%-60%	(2) \$71,200- \$106,800	(4) 9%-18% reduction in exit time Increased service costs	\$44,000 - \$88,000 (\$10,000- \$20,000)
B (5)	On-line auto Inventory and Controls	Autotote Electron	\$100,000 - \$150,000	Exit terminals controlled by central computer	60%-80%		Service cost increased further	(5) Accelerates audit and permits more detailed analysis (\$20,000- \$40,000)

1. Based on maximum estimated loss exposure of \$32,090 (1977) for unaccounted tickets.
2. Based on maximum estimated exposure of \$178,020 (1977) for lost tickets.
3. Based on estimate by Sheldon Fein, Traffic Engineer - SFIA. Savings represents reduction of one-half to one shift per day.
4. Savings represents reduction of one to two shifts per day.
5. Savings of one-fourth to one-half time of senior accountant's salary.
6. Estimate based on interviews with Airport officials in major U.S. cities.





BENEFIT/COST ANALYSIS OF ALTERNATIVE SYSTEMS

The basic system components (entrance and exit equipment) can be combined in various ways to produce integrated systems with differing capabilities and costs. Six different equipment configurations are identified in Exhibit IX. For each configuration, the present value of the estimated annual benefit has been determined and this benefit compared to the estimated cost by means of a benefit/cost ratio.

Based on these analyses, it appears that proportionately greater benefits are provided by configurations with relatively modest capabilities. Although the most sophisticated configurations appear to provide the greatest annual savings, the return on the equipment investment of these configurations is significantly less than that of the less sophisticated configurations. This relationship is graphically presented in Exhibit X.





EXHIBIT IX

CALCULATION OF BENEFIT/COST RATIOS

Equipment Configurations		Manufacturers	Cost: 11 Entrances 15 Exits	Estimated Annual Savings (From Exhibit 3)	Present Value Of Savings (4)	Savings/Cost Ratio (5)
I	A-1 and B-1	Stanley APD Cincinnati <sup>1</sup>	\$171,500 - \$261,000	\$ None	None	N/A
II	A-1 and B-2	William D. White & Co. Cincinnati <sup>1</sup>	\$171,500 - \$238,500	\$ 64,300 - \$128,600	\$355,889 - \$711,778	2.08 - 2.98
III	A-2 and B-3	PPI	\$335,000 - \$402,000	\$121,500 - \$197,800	\$672,600 - \$1,095,000	2.01 - 2.72
IV	A-3 and B-3	Electron	\$401,000 - \$490,000	\$121,500 - \$197,800	\$672,600 - \$1,095,000	1.68 - 2.23
V	A-3 and B-4	Autotote	\$626,000 - \$745,000	\$121,500 - \$197,800	\$672,600 - \$1,095,000	1.07 - 1.47
VI	A-3, B-4 and B-5	Autotote Electron	\$726,000	\$173,000 - \$246,000	\$958,000 - \$1,362,000	1.32 - 1.52

1. Cincinnati manufactures two lines of equipment: A basic mechanical system and a partially automated system.

2. Note that configurations IV and V are similar in most respects except for price.

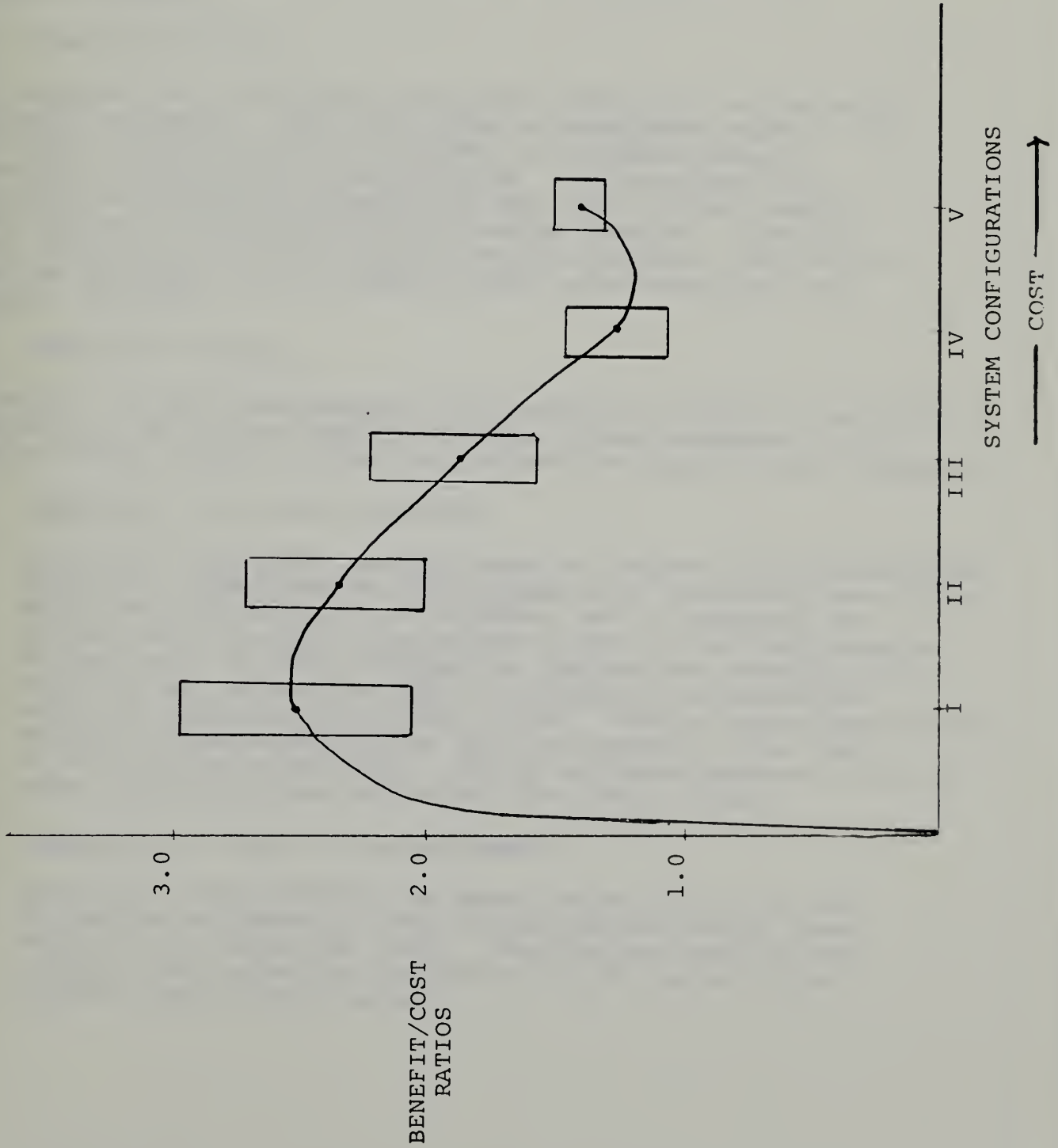
3. Incremental savings over present control systems.

4. Calculated based on an eight year useful life and a 9% interest rate.

5. Ratio of the present value of savings to system costs.



BENEFIT/COST RATIOS FOR ALTERNATIVE SYSTEM CONFIGURATIONS





## RECOMMENDATIONS

Discussions with manufacturers have indicated that the entrance/exit equipment market is very competitive. Any recommendation concerning specific equipment would, therefore, be inappropriate at this time since it would be based on information that is subject to change. In view of the competitive environment and wide range of equipment capabilities, there are certain guidelines that we recommend be followed in the equipment procurement process.

### I. Selection Criteria

Our analyses have indicated that price should not be the only selection criterion. The wide range of equipment capabilities and their appropriateness to the SFIA environment should certainly be taken into consideration. We recommend that equipment be selected primarily on the basis of the benefit/cost approach developed in the preceding section. Clearly, other factors such as reliability and maintenance cost should also be included, but the benefit/cost ratio should be the primary criterion.

### II. Selection Strategy

There are two basic approaches that could be followed in selecting equipment. The primary objective under either approach is to obtain adequate data in order to perform the benefit/cost analyses.

#### Approach I (two stage approach)

Invite all equipment manufacturers to prepare and substantiate potential reductions in loss exposure and operating costs that would be produced by their systems, and to estimate the system cost (including installation and initial maintenance). On the basis of this information, perform the benefit/cost analysis and select the type of equipment configuration with the highest benefit/cost ratio. Develop specifications on minimum system capabilities that correspond to the type of configuration selected. Invite all manufacturers to bid on those specifications and select the lowest bidder.

#### Approach II (single stage approach)

Invite all manufacturers to submit bids with price and documented estimates of anticipated reductions in loss exposure and operating costs. Perform the benefit/cost analysis and select the equipment on the basis of the highest benefit/cost ratio.

The first part of the report discusses the general situation of the company and the results of the previous year. It also mentions the main objectives for the current year.

The second part of the report provides a detailed analysis of the company's performance in different areas. It includes a comparison of the current year's results with the previous year's results.

The third part of the report discusses the company's financial situation and the results of the financial statements. It also mentions the company's plans for the future.

The fourth part of the report discusses the company's human resources and the results of the personnel management. It also mentions the company's plans for the future.

The fifth part of the report discusses the company's marketing and sales activities and the results of the marketing and sales strategy. It also mentions the company's plans for the future.

### III. Timing of Parking Operator and Equipment Selection

The order in which the parking operator and entrance/exit equipment is selected can impact the operating agreement and cash control procedures. If the operator is selected before the equipment, SFIA should reserve the right to specify in the operating agreement new internal control procedures tailored to the new equipment. If the equipment is selected before the operator, the current operator should be consulted in defining control features for the equipment.





APPENDICES



DEFALCATION WITH EXTRA TICKET

Perpetrator: Cashier

Method #1:

- . Cashier obtains an extra, short-term ticket
- . When patron pays long-term ticket, cashier substitutes short-term ticket and rings up short-term ticket change
- . Cashier tells patron he has made an under-ring and performs appropriate procedure on long-term ticket and receipt
- . Patron departs with altered receipt (not available for audit)
- . Cashier substitutes short-term ticket for long-term ticket and keeps the difference between the long-term and short-term change
- . Cashier disposes of long-term ticket

Method #2:

- . Cashier obtains an extra, short-term ticket
- . When patron arrives with a long-term ticket, cashier rings up the correct amount
- . Patron pays and departs with receipt
- . Cashier substitutes short-term ticket for long term ticket and forges driver name and license number on short-term ticket to give appearance of an over-ring ticket
- . Cashier keeps the difference between the long-term ticket and short-term ticket change
- . Cashier disposes of long-term ticket

Preventive Measures:

Cashier

- . Require patron to put telephone number on back of ticket. (This is effective for Method #2 only because the long-term ticket signed by the patron in Method #1 is discarded.)

Audit

- . Monitor over-rings, by cashier (effective only for Method #2)
- . Telephone patron to verify over-rings (Effective only for Method #2)

Equipment

- . Spitter impounds unclaimed tickets
- . Central computer records tickets when at spitter when no car enters the garage and prohibits exit on those tickets
- . Place spikes to rear of spitter to prevent cars backing off
- . Cash register receipt shows entry/exit times, computed fee, and identifies cashier



DEFALCATION WITH EXTRA TICKET

Perpetrator: Third Party/Patron

Method:

- . Third party obtains short-term ticket
- . Third party sells short-term ticket to patron holding a long-term ticket
- . Patron discards long-term ticket and exits garage on short-term ticket

Preventive Measures:

Cashier

- . Checks license plate of all cars exiting against layover list
- . Checks license plate of selected (i.e., dusty/dirty) cars exiting against layover list

Audit

- . None

Equipment

- . Spitter impounds unclaimed tickets
- . Central computer records tickets taken at spitter when no car enters the garage and prohibits exit on those tickets
- . Place spikes to rear of spitter to prevent cars backing off
- . Central computer maintains automobile inventory and can be queried regarding approximate time of car's entrance to garage





DEFALCATION BY CLAIMING LOST TICKET

Perpetrator: Cashier

Method:

- . Patron presents long-term ticket to cashier
- . Cashier under-rings amount of charge
- . Cashier tells patron he has made an under-ring and performs appropriate procedure on ticket and receipt
- . Patron pays and departs with altered receipt (not available for audit)
- . Cashier forges a lost ticket form for an amount equal to charge rung up and substitutes form for long-term ticket
- . Cashier keeps the difference between the long-term charge and under-ring amount
- . Cashier disposes of long-term ticket

Preventive Measures:

Cashier

- . Require patron to provide phone number on lost ticket form

Audit

- . Periodically call patrons to confirm lost tickets

Equipment

- . Cash register automatically computes parking fee



DEFALCATION BY CLAIMING LOST TICKET

Perpetrator: Patron & Partner

Method:

- . Patron with a long-term ticket is met in garage by partner with a short-term ticket
- . Patron with long-term ticket discards the ticket and exits garage using short-term ticket
- . Partner exits garage claiming that his short-term ticket was lost

Preventive Measures:

Cashier

- . Check license plate of all cars exiting against layover list
- . Check license plate of selected (i.e., dusty/dirty) cars exiting against layover list

Audit

- . None

Equipment

- . Central computer maintains automobile inventory and can be queried regarding approximate time of car's entrance to garage



DEFALCATION BY OVERCHARGING PATRON

Perpetrator: Cashier

Method:

- . Cashier rings up correct charge, but tells patron the amount due is greater
- . Patron pays greater amount and does not notice difference in amount paid and amount recorded on receipt
- . Cashier keeps the difference between the amount received and the amount rung up on register
- . If patron does notice difference in amount paid and receipt value, cashier simply claims an under-ring and follows the appropriate procedure

Preventive Measures:

Cashier

- . None

Audit

- . Recompute parking charges to identify false under-rings

Equipment

- . Visual fee indicator lists amount rung up on register
- . Cash register automatically computes parking fee
- . Cash register receipt shows entry/exit times, computed fee, and identifies cashier





DEFALCATION BY REDUCING CHARGE FOR A KICKBACKPerpetrator: Cashier/PatronMethod:

- . Cashier charges patron less than correct amount
- . Patron completes a lost ticket form estimating parking time equal to amount charged
- . Cashier discards patron's ticket
- . Cashier receives kickback from patron

Preventive Measures:Cashier

- . None

Audit

- . None

Equipment

- . Central computer maintains automobile inventory and can be queried regarding approximate time of car's entrance to garage



DEFALCATION BY MISCALCULATING CHARGE FOR A KICKBACK

Perpetrator: Cashier/Patron

Method:

- . Cashier deliberately undercharges patron and rings up the lower amount on the register
- . Cashier receives kickback from patron

Preventive Measures:

Cashier

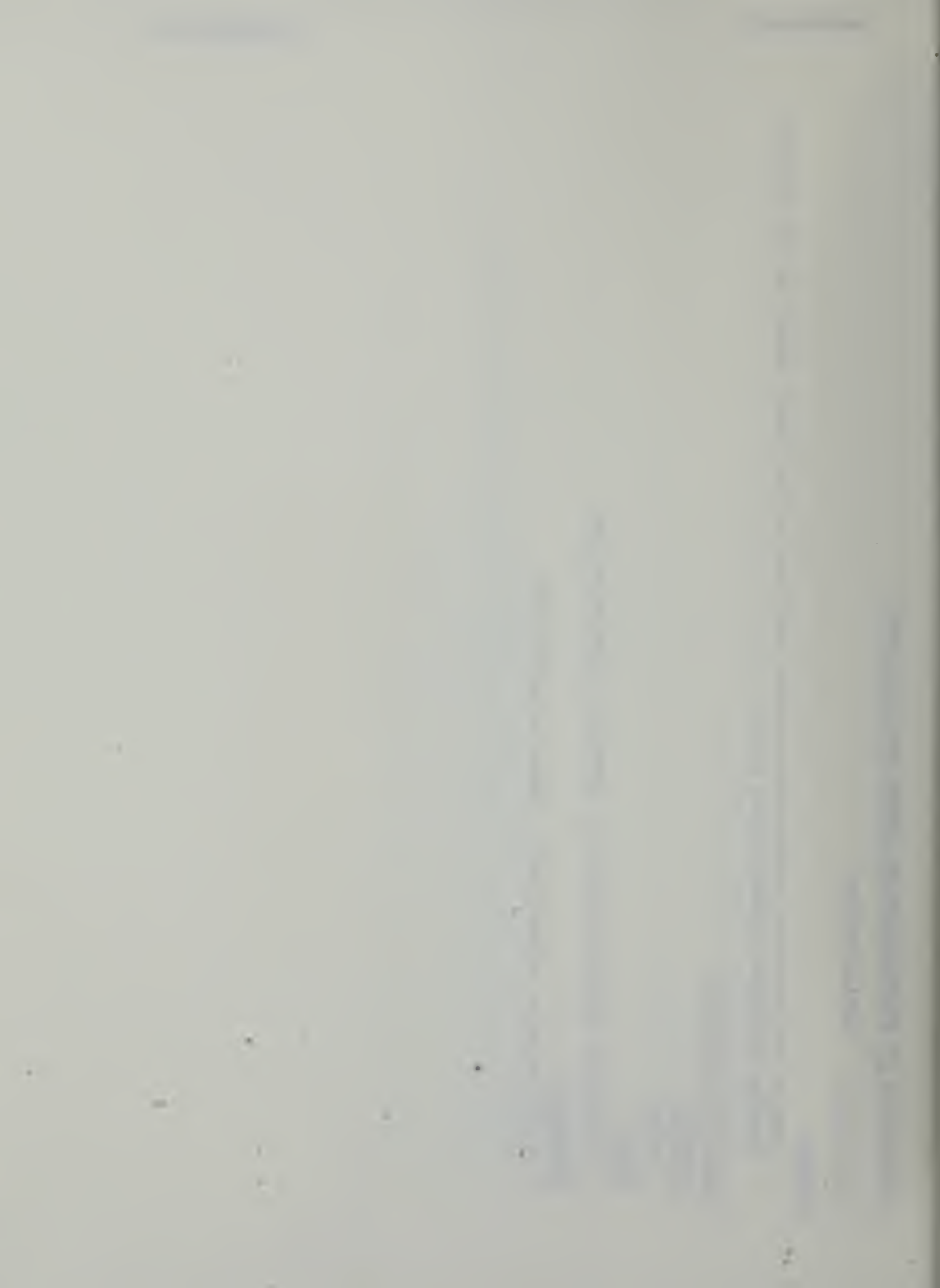
- . None

Audit

- . Recompute parking charges to identify miscalculations

Equipment

- . Cash register automatically computes parking fee



DEFALCATION BY MANIPULATING "TIME-OUT" STAMP

Perpetrator: Cashier

Method:

- . Cashier receives parking ticket from patron but does not stamp "time-out"
- . Cashier charges the correct fee, but under-rings amount of charge on cash register
- . Patron pays correct fee and does not notice difference in amount paid and amount recorded on receipt
- . At end of shift, cashier manipulates time clock to show a lower parking time and stamps ticket
- . Cashier keeps difference between the amount received and the amount rung up on cash register (Cash register amount would tie to amount of time parked, per parking ticket)
- . If patron does notice difference in amount paid and receipt value, cashier can simply claim an under-ring error, alter patron's receipt, and stamp ticket

Preventive Measures:

Cashier

- . Restrict access to time clocks
- . Collect all tickets immediately at end of shift

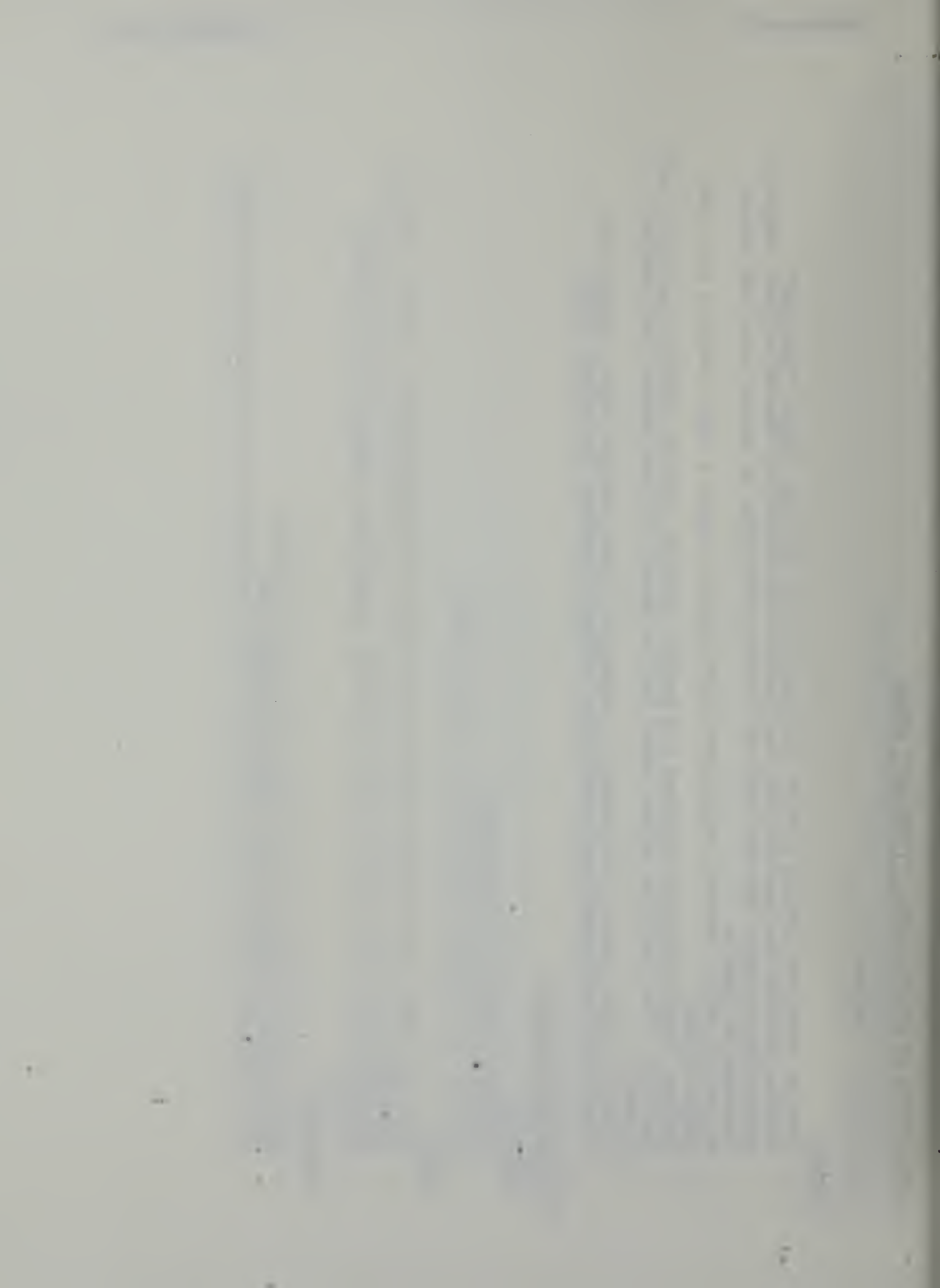
Audit

- . Test for lower than average revenue per ticket for comparable day, shift, and exit location
- . Determine that exit time and cash register transaction numbers are in correct sequence

Equipment

- . Visual fee indicator lists amount rung up on register
- . Cash register automatically computes parking fee
- . Cash register receipt shows entry/exit times, computed fee, and identifies cashier





DEFALCATION BY COLLUSIVE, SYSTEMATIC FRAUD

Perpetrator: Parking garage management and employees

Method:

- . Circumvent internal controls through collusion
- . Falsify records to reconcile with cash deposited in bank

Preventive Measures:Cashier

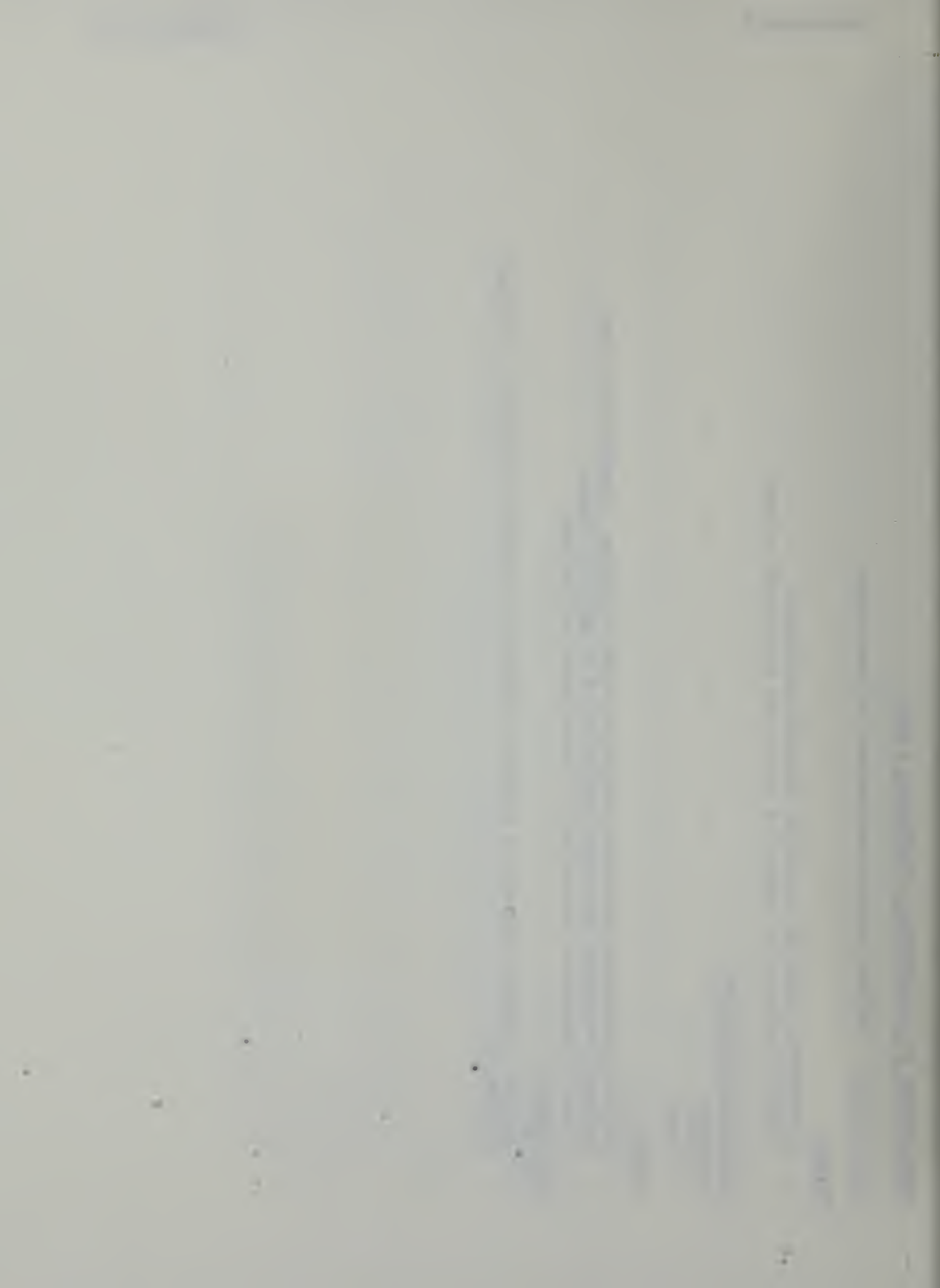
- . None

Audit

- . Airport personnel maintain control of cash register transaction tapes
- . Airport personnel test cash controls on a surprise basis
- . Airport personnel periodically substitute as cashiers

Equipment

- . Central computer placed in Airport offices and reports reviewed by Airport personnel



APPENDIX B

Exhibit B-1 summarizes cost and other information on recent installations at major airports that we have been able to verify.

Although there appears to be considerable variation in system costs for Autotote and Electron installations, differences in the size and sophistication of the systems - which are significant - explain most or all of this variation.

A reconciliation of the cost difference between Autotote's Philadelphia installation (\$325,000) and its Detroit system (\$1,310,000) is provided below:

Philadelphia System Cost:	\$325,000
+ On-line capability	150,000
+ Extra computer	50,000
+ Installation*	150,000
+ Service contract	100,000
+ 11 extra entrances	220,000
+ 9 extra exits	<u>315,000</u>

Detroit System Cost: \$1,310,000

\*Extensive wiring and electrical contracting was included in the equipment contract

A reconciliation of the cost difference between Electron's Calgary installation (\$500,000) and its Toronto system (\$1,250,000) is also provided:

Calgary System Cost:	\$500,000
+ On-line capability	200,000
+ Electric signs	200,000
+ 4 entrance lanes	65,000
+ 6 exit lanes	110,000
+ Maintenance	75,000
+ Cost premium*	<u>100,000</u>

Toronto System Cost: \$1,250,000

\*Toronto was first system installed by Electron and accordingly was priced above later systems.

It is apparent that the price of garage control equipment is highly sensitive to such factors as:

- Amount and sophistication of equipment purchased
- Effects of competitive bidding
- Maintenance contracts
- Construction work indirectly related to installation of the control equipment.

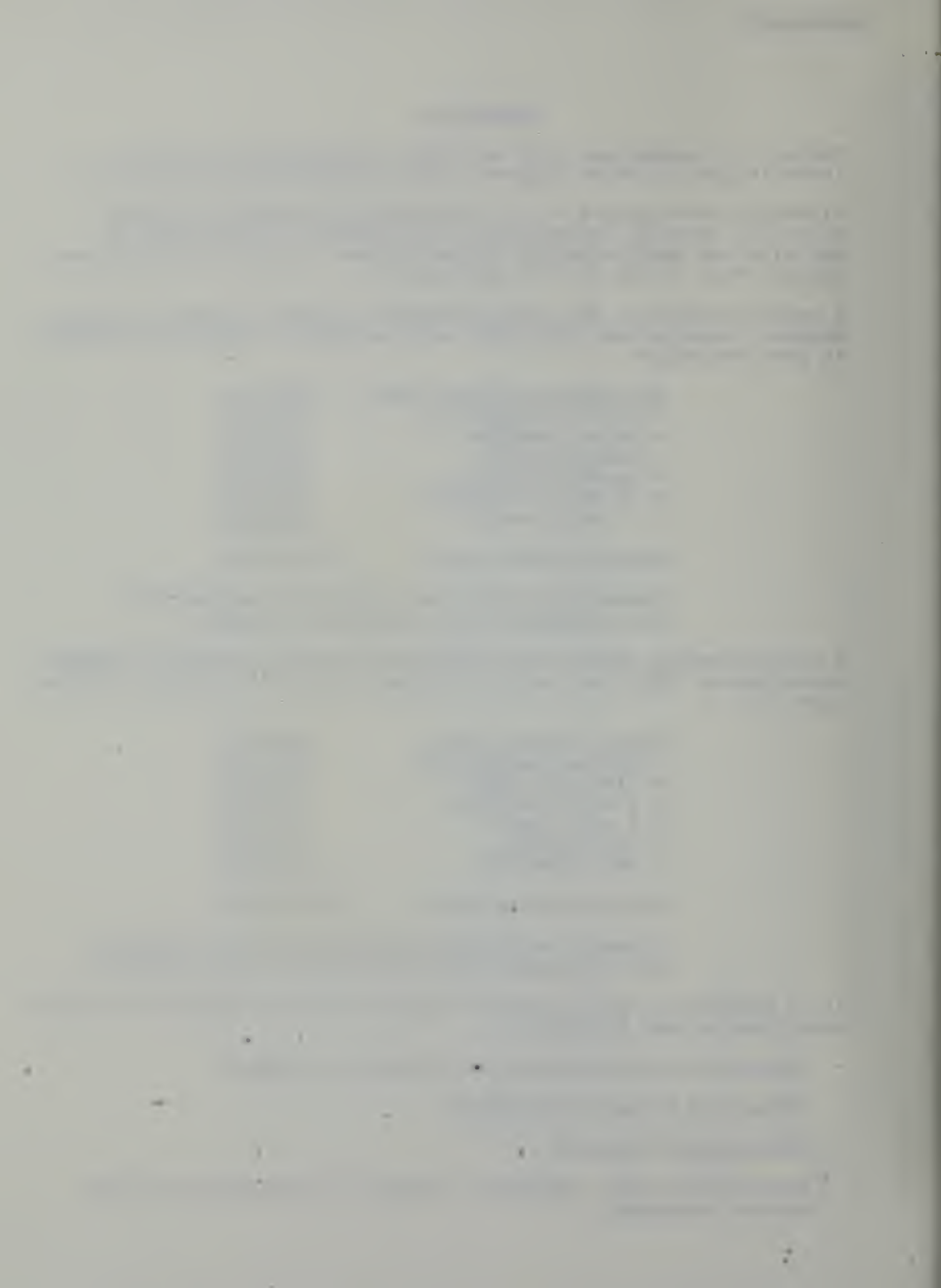


EXHIBIT B-1

RECENT ENTRANCE/EXIT EQUIPMENT INSTALLATIONS AT MAJOR AIRPORTS

	(Proposed) San Francisco	Detroit	Philadelphia	Washington D.C.	Toronto	Calgary	Greater Cincinnati
Number of parking locations	2	1	2	1	1	1	1
Total parking spaces	8,300	7,500	3,200	3,340	5,400	1,800	4,500
Equipment Manufacturer		Autotote	Autotote	Electron	Electron	Electron	Cincinnati
Entrance lanes (1 splitter/lane)	11	15	4	4	7	3	6
Exit lanes	15	15	6	4	10	4	7
Computer-based		Yes - 2	Yes	Yes	Yes	No	Yes
On-line		Yes	No	Limited	Yes	-	No
Approximate system cost		\$1,3MM	\$325K	\$330K	\$1.25MM	\$500K	\$150K
Estimated useful life		8 years	10 years	8 years	15 years	15 years	10 years
Estimated annual maintenance cost		\$100-\$150K	\$5-\$10L	\$12K	\$30K	?	?

\* 15,000 spaces by 1981

